Serial No. 10/088,206
Group Art Unit: 2859
Examiner: Gail Kaplan Verbitsky

REMARKS

Acknowledgment of Examiner Conference

Applicant's attorney acknowledges with gratitude the opportunity to discuss this application in person with the Examiner on June 1, 2004. The amendments to the claims presented in this paper were discussed at the interview and the prior art as represented by Yamashita U.S. 5,318,077; Cramer et al. U.S. 6,000,844; and Schmidt et al. U.S. 5,352,038 was discussed as well. During the exchange, the Examiner communicated to Applicant's attorney the basis for the rejections in more detail and Applicant's attorney presented the case for patentability of the rejected claims on grounds of novelty and non-obviousness.

Agreement was not reached with regard to the patentability issues but it was agreed that the Examiner would reconsider the matter in light of the perspectives of the inventive subject matter presented during the conference.

Remarks

It is the Examiner's contention that claims 13-18, 21, 28-29 interpreted in their broadest sense recite nothing more than measuring wear of an element by detecting and analyzing its temperature. It is the Examiner's opinion that this broad concept is obvious in view of prior art as represented by Yamashita '077; Cramer et al. '844; and Schmidt et al. '038.

The Examiner interprets Yamashita as providing a basic teaching of measuring wear of a rapier band by "electromagnetic energy" (using the broadest meaning of radiated or electrical energy in any form) to provide a signal indicative of the wear of a rapier band. While Yamashita does not express a recognition in the art that temperature of the rapier band may be detected to determine its wear, Cramer et al., according to the Examiner, reveals that a person skilled in the art provided with the teachings of Cramer would recognize that Yamashita could be modified to use "electromagnetic energy" (temperature radiation) as indicative of varying thickness of

other properties that inherently would indicate the wear characteristics of a rapier band on an operating loom.

Applicant contends that there is absolutely no teaching in the prior art, in particular the loom-related art, that would suggest to a person skilled in the art that the temperature of a rapier band during operation of a loom may be utilized as a detector of wear in the band. Indeed, there is no teaching available to a person skilled in the art, in Applicant's opinion, that would even suggest or teach the person skilled in loom technology that the thinning of a rapier band during its operation would result in a change in the temperature of the band or an element in frictional contact with the band, such as a guide element, and that detection of such change can be a reliable indicator of the changing characteristics of the band caused by wear, usually thinning of the band.

As described in the third full paragraph on page 4 of the description:

> The invention is based on the discovery that, as the wear of the rapier band 1 progresses, that is as said band 1 becomes thinner, the temperature of the rapier band 1 and also that of the guide element 3 will change. This phenomenon is attributed to the position of the rapier band 1 changing relative to the guide element 3, and thereby the friction between the two also changing. The wear in such looms usually entails that the friction between the rapier band 1 and the guide element 3 will increase, hence the frictional heat also increasing. This phenomenon is exploited to monitor rapier band wear by analyzing the temperature as a characteristic value of the wear of the rapier band 1.

During the conference mentioned above, the Examiner acknowledged that the

prior art did not specifically reveal any teaching that the temperature of a rapier band of an operating loom could provide an indication of the wear of the band. Applicant submits that the recognition of such a phenomenon represents itself an inventive discovery worthy of patent protection.

While the prior art may contain teachings that temperature in general may be an indicator of wear of an object, the issue in this instance is not whether or not it constitutes invention to measure temperature as an indicator of wear of an element, but whether or not the discovery and observation that a rapier band gets hotter as it gets thinner and that the temperature of the band and the guides in frictional contact with the band likewise get hotter, and that the operating temperature of the band can be used to detect the band wear, constitutes the true inventive concept that transcends general knowledge that the temperature of some objects increases as a function of its continuing use and wear.

Thus, while detecting the temperature of a tire to determine its wear may be known in the prior art, a person skilled in the loom art would not be expected to look to the tire wear measurement art to solve a problem in a rapier loom machine involving detection of the wear of the rapier band of the machine.

The question posed to the Examiner is, what would lead the person skilled in the loom art to even investigate the temperature of a rapier band to determine its wear characteristic in the absence of any suggestion in the prior art that a rapier band of a rapier loom gets hotter (or even cooler) as it wears and gets thinner? Where is there a clear suggestion or teaching that a person skilled in the loom art would consider detecting the temperature of a rapier band as opposed to its physical position or some other characteristic as an indicator of its becoming thinner? It is respectfully submitted that no such teaching exists and the relevancy of the cited prior art relied on by the Examiner in rejecting the above-mentioned claims is remote and tangential.

More specifically, considering the secondary reference Cramer et al., the entire teaching of this patent revolves about applying heat from an external source onto a surface of a material moving at a constant speed whereby irregularities in the heat

absorbed by the surface can be detected downstream of the heating element to provide an indication of irregularities such as inconsistent thickness, poor bonding, poor welds or other abnormalities that would reflect differential temperature.

It is inconceivable that a person skilled in the art of rapier looms would ever look to a thickness and defect measuring system of the kind described in Cramer. A rapier band never moves at constant speed but instead reciprocates very rapidly from a static retracted position to an extended position and back to a retracted position during loom operation. It is suggested that the Examiner familiarize herself with rapier loom operation and the nature of motion of the rapier band. The rapid velocity changes of a rapier band during loom operation would prevent effective use of any system such as taught by Cramer in combination with Yamashita.

In Cramer, the heat source must be constant and is supplied externally of the material being tested. The degree of heating is critical as is the detection of the reflection of heat sensed by the temperature detectors. Only local variations in the temperature of the object under test may be observed by the detector in accordance with Cramer, while in accordance with the present invention, the temperature of the rapier band is detected while the loom is operating and as a practical matter any attempt to sense localized differential temperature over the band to determine irregularities or local changes in thickness would be impractical. The scope of the written description and the scope of the claims effectively rules out the relevancy of prior art that only teaches the detection of local thickness variations and defects using a highly sophisticated system relying on input of heat to a surface of an object moving at constant speed relative to the heat source and the reflected heat detector.

In this same context, with regard to the teachings of Schmidt et al, the Examiner contends that this document provides a broad teaching of relying on electromagnetic energy (infrared radiation) reflected from a surface to determine defects in an object by comparing a differential signal between a measured (first site) temperature and a standard (second site) temperature. The relevancy of Schmidt et al. is not understood, as this document only teaches detection of surface roughness by measuring reflected

infrared energy impinged on the surface by an infrared radiator at an oblique angle. In accordance with Schmidt et al., measuring the temperature of reflected infrared radiation that is directed to the surface of a material along an oblique path is indicative of the surface roughness of the material.

The Examiner concludes that it would have been obvious to one of ordinary skill in the art to replace the wear sensing device disclosed by Yamashita with the "wear" or "defects" sensing device of Schmidt et al. because they both detect wear or defects using electromagnetic energy and may be used interchangeably.

It is respectfully submitted that the Examiner's logic on this point only establishes that temperature detection and generation of temperature signals may be used in certain environments to provide a measurement of a property of an object. Applicant is not claiming such a concept. To suggest that a surface roughness detector using radiant energy detection can be introduced into Yamashita to establish obviousness of the claimed invention, with respect, defies logic.

With reference to the rejected claims, claim 13 recites a method of monitoring the wear of a rapier band of a rapier loom wherein the rapier band moves in contact with guide elements comprising generating a temperature signal indicative of temperature of the rapier band caused by friction between the rapier band and the guide elements while the loom is operating and analyzing the temperature signal as a wear characteristic value of the rapier band.

Claim 14 recites subject matter that is parallel to that of claim 13, except the temperature signal is taken from a loom component in contact with the rapier band.

Claim 15 recites the invention in terms of generating a temperature signal indicative of the temperature of a selected loom component in contact with the rapier band moving relative to the component while the loom is operating.

Clearly, the subject matter of the claims is founded on the discovery that, in a rapier loom, the temperature of a rapier band as it wears can provide an indication of the degree of wear experienced by the band. The temperature of the band is taken while the loom is operating and thus reflects the continual change in temperature of the

rapier band during loom operation. The environment of the invention lies in the field of rapier looms and the problem to be solved is detecting the degree of wear of a rapier band over time while the loom is operating.

It is respectfully submitted that a person skilled in the art attempting to solve the problem of detecting the wear of a rapier band would not be taught by the prior art to investigate the temperature of the band as an indication on its wear. There simply is no such teaching that has surfaced up to the present time.

The claims have been amended in a manner to make it clear that the temperature of the rapier band results from friction between it and its guide elements. Thus, the claims as presently worded make it clear that an external heating source is not used to change the temperature of the rapier band in order to provide a temperature signal indicative of the wear characteristics of the band.

The Examiner is invited to review the comments made in the response to the previous official action, all of which are incorporated herein by reference.

With respect to the apparatus claims 21, 24/21, 28/21, and 29/21, it is respectfully submitted that the prior art fails to provide any teaching of apparatus including a temperature signal generating arrangement arranged to generate a temperature signal indicative of the temperature of the rapier band during operation of the loom in combination with an analyzer arranged to receive and analyze the temperature signal as a wear characteristic value of the rapier band. As discussed above, the teachings of Cramer and Schmidt fall far short of making up for the deficiencies in Yamashita in establishing obviousness of the claimed subject matter. The apparatus claims do not attempt to seek patent protection for the broad concept of measuring wear as a function of temperature. Rather, the claims are directed to the surprising and non-obvious discovery that the temperature of a rapier band changes as it gets thinner due to the change is its relationship with its guides and that the detection of the band temperature sensed while the loom is operating provides an indication of the degree of thinness of the rapier band as compared to its thicker condition.

It is respectfully submitted that this discovery is entitled to protection in a context

of a rapier loom irrespective of teachings in other non-relevant technologies of measuring temperature as an indicator of a physical property of an object.

The absence of extended discussion of the patentability of the remaining rejected claims is not intended to imply a concession as to the rejections thereof, but it is submitted that the discussion and arguments already presented are applicable as well to all the rejected claims.

It is respectfully submitted that withdrawal of the finally rejected claims in this application is warranted and the same is respectfully solicited.

Respectfully submitted,
BACON & THOMAS, PLLC

J. ERNEST KENNEY
Attorney for Applicant
Registration No. 19,179

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BACON & THOMAS, PLLC
625 Slaters Lane
Fourth Floor
Alexandria, Virginia 22314
Telephone: (703) 683-0500
Facsimile: (703) 683-1080

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